

1 I claim:

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4 1) An apparatus for the downloading of a code image to  
5 a wireless receiver, said apparatus having:

6 a Sequence Controller generating a ROM controller  
7 output and a CPU enable output;

8 a ROM for the storage of a boot image;

9 a DMA controller responsive to a SRC, DST, and LENGTH,  
10 said DMA controller copying data from a source specified by  
11 SRC to a destination specified by DST for a duration  
12 specified by LENGTH;

13 a ROM controller coupled to said ROM, said ROM  
14 controller initializing said DMA controller upon assertion  
15 of said ROM controller output by copying said SRC, said DST,  
16 and said LENGTH from the contents of said ROM;

17 a memory responsive to said DST;

18 a CPU coupled to said memory, said CPU enabled upon the  
19 assertion of said CPU enable output;

20 said CPU enable output asserted after said DMA  
21 controller has copied said ROM data to said memory;

22 a wireless front end coupled to said CPU, said CPU  
23 downloading an operating system image for use by said CPU.

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1           2) The apparatus of claim 1 where said memory is a  
2 static random access memory.

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4           3) The apparatus of claim 1 where said memory is a  
5 dynamic random access memory.

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7           4) The apparatus of claim 2 where said static random  
8 access memory is addressed by said SRC.

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10          5) The apparatus of claim 3 where said CPU downloads  
11 said operating system image into said dynamic random access  
12 memory.

13  
14          6) The apparatus of claim 1 where said sequence  
15 controller uniquely asserts said ROM controller output and  
16 said CPU enable output.

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18          7) The apparatus of claim 1 where said sequence  
19 controller first asserts said ROM controller output, and  
20 asserts said CPU enable output after completion of copying  
21 of said LENGTH from said SRC to said DST.

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23          8) The apparatus of claim 1 where said boot image  
24 includes instructions for:

25           sending a download request;

1       receiving a packet accompanied by a sequence number;  
2       discarding a packet with the same sequence number as an  
3 earlier-received packet;  
4       accepting a packet with a unique sequence number;  
5       sending a download request if a gap in sequence numbers  
6 is detected.

7

8       9) The apparatus of claim 1 where a download server  
9 with a wireless interface receives a download request from a  
10 wireless client and responds to said download request by:

11       sending download data including a sequence number, each  
12 download data comprising an original packet and a duplicate  
13 packet each including said sequence number;

14       incrementing the sequence number for each subsequently  
15 sent download data;

16       upon sending all said download data, thereafter sending  
17 a "done" packet indicating completion of the download.

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20       10) A process for the downloading of wireless code to a  
21 receiver, said process comprising:

22       a first step of copying a SRC, DST, and a LENGTH from a  
23 ROM to a DMA controller;

1       a second step of said DMA controller copying additional  
2 data from said ROM responsive to said SRC address to a  
3 memory responsive to said DST address;

4       a third step of a CPU executing instructions located in  
5 said memory;

6       a fourth step of said CPU downloading an operating  
7 system from a remote host.

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9       11) The process of claim 10 where said SRC address  
10 selects said ROM and said LENGTH defines a contiguous region  
11 of said ROM.

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13       12) The process of claim 10 where said DST corresponds  
14 to an address of a region in said memory.

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16       13) The process of claim 10 where said third step said  
17 CPU instructions includes the instructions for:  
18       transmitting a download request;  
19       receiving a packet accompanied by a sequence number;  
20       discarding a packet with the same sequence number as an  
21 earlier-received packet;  
22       accepting a packet with a unique sequence number;  
23       sending a download request if a gap in sequence numbers  
24 is detected.

1        14) The process of claim 10 where said fourth step  
2 includes:  
3        sending a download request;  
4        receiving a packet accompanied by a sequence number;  
5        discarding a packet with the same sequence number as an  
6 earlier-received packet;  
7        accepting a packet with a unique sequence number;  
8        sending a download request if a gap in sequence numbers  
9 is detected.

10  
11       15) The process of claim 10 where said remote host  
12 responds to said download request by:  
13       sending download data including a sequence number, each  
14 download data comprising an original packet and a duplicate  
15 packet each including said sequence number;  
16       incrementing the sequence number for each subsequently  
17 sent download data;  
18       upon sending all said download data, thereafter sending  
19 a "done" packet indicating completion of the download.

20  
21       16) The process of claim 15 where said download data  
22 includes an operating system for use by said CPU.

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24       17) The process of claim 10 where said original and  
25 said duplicate packet are not interleaved.

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2        18) The process of claim 10 where said original and  
3 said duplicate packet are interleaved.  
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5        19) The process of claim 10 where said duplicate packet  
6 includes a plurality of packets, each said packet having the  
7 same said Tx\_Seq\_Num as said original packet.  
8

9        20) A process responsive to a download request, said  
10 process for transmitting packets from a wireless  
11 transmitter, said process including the steps:

12        transmitting data comprising an original and a  
13 duplicate packet, each said packet having a Tx\_Seq\_Num, each  
14 subsequent data having a Tx\_Seq\_Num which is unique;

15        transmitting a DONE packet after transmission of all  
16 prior said data.  
17

18        21) The process of claim 20 where said original packets  
19 are transmitted in sequence, each accompanied by said  
20 Tx\_Seq\_Num, followed by said DONE packet, followed by said  
21 duplicate packet accompanied by said Tx\_Seq\_Num, followed by  
22 said DONE packet.  
23

24        22) The process of claim 20 where said data is  
25 transmitted sequentially, such that each said original

1 packet is followed by said duplicate packet, each said  
2 original and said duplicate packet having said Tx\_Seq\_Num  
3 which is unique.

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5 23) The process of claim 20 where said unique  
6 Tx\_Seq\_Num includes each said data having said Tx\_Seq\_Num  
7 which is incremented.

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